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ORIGINAL ARTICLE

When Eating Becomes a Challenge: A Cross-Sectional Study of Picky Eating Behaviours and Parental Nutritional Practices in Young Children

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ABSTRACT

Purpose; The focus of this research is on the following three hypotheses: (1) Children who are underweight are more food fussy and exhibit more emotional overeating than their normal weight/overweight/obese fellows; (2) Implementing positive parental nutrition practices more frequently leads to a decrease in food fussiness; (3) The level of food fussiness has a negative correlation with positive parental practices and a positive correlation with coercive practices.

Methodology: The research employed a cross-sectional methodology during the period of January to June in the year 2025. The research was centered in 3 public schools located in the region of Wah Cantt, Punjab, Pakistan. The participants of the research included 360 children between the ages of 3 and 6 along with their primary caregivers. These research participants were obtained through a randomized sampling technique. The research employed a number of validated and culturally adapted instruments, notably the Child Eating Behavior Questionnaire (CEBQ) and the Parental Feeding Styles Questionnaire (PFSQ), for the collection of the needed data. Relevant anthropometric data was also collected and used in the calculation of the BMI-for-age Z-scores of the children. The research data was processed and analyzed using one-way ANOVA, paired t-tests, and Pearson correlation. The p-value was set at $p < 0.05$ to determine the level of significance.

Results: Among the different BMI categories, underweight children experienced the highest levels of food fussiness ($M = 2.47$) and emotional overeating ($M = 2.48$) with these behaviors decreasing as BMI increased. Differences in the level of food fussiness and emotional overeating were statistically significant (food fussiness: $F(3, 356) = 16.99$, $p < .001$, $\eta^2 = .125$; emotional overeating: $F(3, 356) = 37.63$, $p < .001$, $\eta^2 = .240$). Children whose parents practiced positive feeding more frequently had statistically significant lower food fussiness scores ($M = 2.00$) in comparison to those whose parents practiced positive feeding less frequently ($M = 2.28$), $t(358) = 3.618$, $p < .001$, Cohen's $d = 0.379$. The degree of food fussiness was negatively correlated with positive feeding ($r = -0.188$, $p < .01$) and positively correlated with coercive feeding ($r = 0.210$, $p < .01$). A strong inverse correlation was also identified between positive and coercive feeding ($r = -0.534$, $p < .01$).

Conclusion: The results show that lower BMI in preschoolers is linked to greater picky eating and emotional over eating. Positive parental practices in nutrition reduces picky eating, while coercive parental nutrition practices increases picky eating. These findings reinforce the case for parental targeted approaches to nutrition counselling in early childhood in Pakistan.

Keywords: Body Mass Index, Coercive feeding, Emotional overeating, Feeding strategies, Parental nutritional practices Picky eating.

INTRODUCTION

Picky eating behaviour, defined as a child's refusal to consume certain foods based on preferences, aversions, or sensory sensitivities, is a prevalent behavior that restricts dietary variety and may lead to nutritional deficiencies.[1] Selective eating in children might mean preference to eat certain foods and refusal to eat in a class of food or some food, or some food belonging to a class of food, some certain class of food, and some certain types of food. These classifies may lead to very poor nutritional value which a child may eat. These behaviors manifested in the tend to emerge in early childhood, especially in the preschool age, and can become a source of considerable distress to the parent trying to implement healthy eating habits in the child.[2] The consequences of the eating habits of children who tend to be picky are not limited to the food intake, but span to possible future ramifications for the child's health, in relation to development in a grown child, in term of physical and mental prosperity, along with possible exposure to long term diseases.[3] New Insights in the area of picky eating are critical when it comes to evaluating the situation regarding a child's health and lifestyle when growing up.

The range of regions and populations studied reflects the socio-cultural and environmental issues which influence the prevalance and variability of picky eating behavior.[4] For example, while selective eating behaviors are reported to occur in approximately 25% of children in India, in Iraq, the occurrence is reported to be as high as 77%. Such differences suggest the significance of values systems, food resources, and parenting styles in the development of children's eating patterns. However, even though such behaviors are commonplace, there are some contexts especially within the cultural context of northern Taiwan which are under-researched, and even frowned upon for lacking the precise statistics such as the one which emphasizes parenting.[5] With such behaviors being apparent within and across cultural settings, there indeed is a need for quantitative research to highlight and determine the relationships across populations.

There are many reasons that contribute to the emergence of picky eating in young children. Parental attitudes and feeding practices are of particular importance considering the tendency of children to learn behaviors through observation and imitation. Psychological factors and developmentally determined phases of evolution of taste preferences such as anxiety and aversion to certain foods contribute to even more selective eating.[6] Also, temperament, like negative affectivity combined with low effortful control, plus certain parental feeding practices, like being overly restrictive or pressuring, tend to combine and reinforce the tendency towards picky eating.[7] These many, often conflicting, reasons underpin the importance of numerous factors involved when dealing with picky eating and the need to address both the child and the parent.

Although the issue of picky-eating has been identified in the nutrition and developmental landscape of children, research pertaining to this issue has been understudied in emerging economies, particularly in Pakistan. Studies from other areas, like northern Taiwan, on the other hand, have shed light on the issue of picky eating.[8] They continue to struggle, however, with the lack of contextual and longitudinal data, as well as parameters pertaining to health outcomes. The same holds true concerning the issue of picky eating and nutrients intake in school aged children as well as the role of early child feeding, home surroundings and parents. A myriad of other jurisdictions have started to look at the relationships between child behavior, parental feeding techniques, and the dietary outcomes of the child, however, very few have done this kind of analysis in Pakistan, which is a developing and resource-divergent country.[9] Closing these gaps is of utmost importance in developing strategies that will decrease the prevalence of picky eating and increase the likelihood of healthy eating behavior, particularly in children.[10]

In Pakistan, cultural and clinical contexts create distinctive challenges to understanding and addressing the phenomenon of picky eating. Deficient cultural and clinical anthropological research exacerbates this phenomenon. Therefore, this study attempts to identify and analyze the socio-demographic, parental, and psychological determinants of picky eating, and the subsequent consequences, on the nutrition of preschool Pakistani children, as well as the extent to which the role of parents mediates this. By focusing on the socio-demographic and parental determinants of selective eating, this study will identify practical clinical and community nutrition applications. The clinical, community, and public nutrition implications of this work will directly inform pediatricians, dietitians, and caregivers of culturally specific, evidence-based, opportunistic preschool feeding approaches. Positive feeding practices will balance culturally specific prescriptions with appropriate preschool nutrition. Positive feeding approaches will balance the culturally specific pedagogical prescriptions with evidence-based practice. This study will provide evidence to inform public health and early childhood nutrition programs, and parental education within the socio-cultural context of Pakistan.

The present study tests three specific hypotheses grounded in Self-Determination Theory and the Feeding Practices Framework:

Hypothesis 1: Picky eating (food fussiness) and emotional overeating behaviors differed significantly across different BMI categories in young children.

Hypothesis 2: Frequent use of positive parental nutritional practices was associated with lower levels of picky eating (food fussiness) in young children compared to infrequent use of such practices.

Hypothesis 3: Picky eating behaviors (food fussiness) were significantly correlated with parental nutritional practices, with positive practices showing a negative correlation and coercive practices showing a positive correlation with picky eating.

MATERIAL AND METHOD

The study aimed to examine associations between picky eating behaviors, emotional overeating, and parental feeding practices among young children aged 3–6 years. Sample size was determined using G*Power 3.1 for a one-way ANOVA across four BMI categories, assuming a medium effect size (Cohen's f = 0.25), alpha of .05, and statistical power of .80, with adjustments for clustering by school (ICC = 0.05, design effect = 1.34). The minimum required sample was 292, increased to 322 to account for potential non-response, and ultimately rounded to 360 participants to ensure equal distribution across schools. We reported means with 95% CIs and calculated effect sizes (Cohen's d, partial η^2) for all comparisons. Normality (Shapiro–Wilk), variance homogeneity (Levene's test), and missing data (<5%, complete-case analysis) procedures were applied and disclosed. Systematic sampling was employed, wherein all parents dropping children on designated days were assigned sequential numbers, and every third parent was invited until the quota of 120 participants per school was achieved. Inclusion criteria required participants to be the primary caregiver of a child aged 3–6 years without chronic illness, while non-primary caregivers or children with developmental disorders were excluded.

The culturally adapted versions of the Child Eating Behavior Questionnaire (CEBQ) and the Parental Feeding Style Questionnaire (PFSQ) served as the primary data collection instruments. The CEBQ focused on the individual elements of food fussiness and emotional overeating, and the PFSQ focused on positive and coercive feeding practices. All instruments reported on underwent a rigorous process of translation and cultural adaptation, which consisted of forward translation into Urdu by a committee of two bilingual specialists, translation synthesis and single-verse adaptation into Urdu, English back-translation, and then independent committee validation by a nutritionist, an Urdu psychologist, and a pediatrician, as a means of ascertaining semantic, idiomatic, and conceptually equivalent measures. The objective of the pilot test, which involved thirty participants, was to provide an assessment of cultural context, relevance, comprehension, and the mental acuity of the item. The instruments were then modified into the final Urdu version which may be used for testing. All subscales showed satisfactory internal consistency and the performance of the respective subscales are as follows: for food fussiness, emotional overeating, positive practices, and coercive practices, the subscale alphas were 0.84, 0.79, 0.88, and 0.76, respectively, and the corresponding McDonald's omega reliabilities were 0.85, 0.80, 0.89, and 0.77, confirming the instruments are reliable and the subscales are meaningful.

The height, weight, and age measurements were taken and processed with a digital ultrasonic scale (H07), after which the BMI-for-Age Z scores (BAZ) were calculated using the WHO AnthroPlus software (v1.0.4). Children were classified as underweight ($Z < -2$), normal weight ($-2 \leq Z \leq 1$), overweight ($Z > 1$), and obese ($Z > 2$). All analyses and inter-group comparisons were conducted using appropriate methodologies which aligned with the standards set forth by the World Health Organization to ensure the results were methodologically sound and could be compared to results from other countries.

The statistical analyses, conducted using SPSS version 25, included one-way ANOVA With Post-Hoc Turkey Test to compare difference in eating behaviours within the BMI categories, independent samples t-tests with encouragement feeding practices, and Pearson correlations between feeding practices and Picky Eating Habits to determine the strength and direction of the relationships. All analyses were conducted using a $p < .05$ significance level and the results were reported with effect sizes (η^2, Cohen's d). Ethical approval was obtained from the Wah Medical College Institutional Review Board, and all participants were provided with informed consent (ERC/ IRB no. 000105).

RESULTS

In the Table 1, the characteristics of the 360 subjects aged 3 to 6 years alongside their demographic details are shown. A majority of the subjects, 46.1%, were aged 3 years, describing the early preschool stage, whereas 27.2% were 4 years old in the mid preschool stage and 26.7% were 5 to 6 year olds in the late preschool stage. The sample also had a lopsided ratio of females 64.4% to males 35.6%. As per the WHO Child Growth Standards BMI-for-age Z-scores BAZ, about 38.3% of the subjects were classified as having a normal BMI ($-2 \leq Z \leq 1$). Furthermore, 25% were classified

as underweight (Z < -2), 20.6% were overweight (Z > 1) and 16.1% were classified as obese (Z > 2). The socioeconomic status of the families indicated that 38.1% of the families were classified as low income, 36.9% were classified as middle income, while 25% were classified as high income.

To investigate the effects of Body Mass Index (BMI) on the levels of Food Fussiness (FF) and Emotional Overeating (EOE) in young children, a one-way ANOVA was conducted on the subscales of the Children's Eating Behavior Questionnaire (CEBQ). The analysis of Variance illustrates a significant effect of BMI on food fussiness (FF) scores, $F (3, 356) = 16.99$, $p = .000$, $\eta^2 = .125$, indicating a small BMI effect on food fussiness. The underweight group was shown to have a higher food fussiness disposition (M = 2.47, SD = 0.71, CI = 2.26 – 2.68), compared to the normal weight (M = 2.15, SD = 0.77, CI= 1.99-2.31), overweight (M = 2.01, SD = 0.71, CI= 1.84-2.18), and obese (M = 1.64, SD = 0.49, CI= 1.45-1.83) groups. Post hoc tests showed a significant linear effect such that as BMI increases, food fussiness (FF) decreases (1 > 2 > 3 > 4). This means children with a lower body weight are more likely to be picky eaters, and display food fussiness.

A similar pattern was determined for emotional overeating with a statistically significant difference across the BMI categories: $F (3, 356) = 37.63$, $p < .001$, $\eta^2 = .240$. This effect size, which is moderate, suggests that BMI has a stronger association with emotional overeating than with food fussiness. Again, the underweight group had the highest mean (M = 2.48, SD = 0.50, CI= 2.36-2.60), followed by the normal weight (M = 2.14, SD = 0.40, CI= 2.06-2.22), overweight (M = 1.99, SD = 0.45, CI= 1.90-2.08), and obese (M = 1.71, SD = 0.46, CI= 1.62-1.80) groups. The post hoc comparison pattern (1 > 2 > 3 > 4) reveals that emotional overeating is inversely correlated with BMI children with lower BMIs are more prone to emotional overeating than are children with higher BMIs.

A paired samples t-test was conducted to see how positive parental nutritional practices impacted picky eating behaviors operationalized as Food Fussiness (FF). Differences between the two groups was $t (358) = 3.618$, $p = .000$, which was moderate in strength (Cohen's $d = 0.379$). Children with parents who reported positive practices frequently scored lower on the food fussiness scale (M=2.00, SD = 0.736) than those who were reported to have infrequent positive practices (M=2.28, SD = 0.74). This data indicates that positive practices may encourage food variety and the involvement of children in food preparation also help in reducing picky eating behaviours with children.

A total of 360 children were studied on FF scales for Food Fussiness within the context of their parental Positive and Coercive Practices nutritional interventions. The average values for the FF scales stood at 2.12 (SD = 0.75), whereas Positive Practices reached a rather high average of 4.56 (SD = 0.49) and Coercive Practices recorded a rather low average of 1.53 (SD = 0.49). The correlation of FF with Positive Practices indicated a considerable degree of disassociation Positive Practices (defined in the study as less use of supportive and encouraging feeding strategies) with a worrying growth of the less favourable traits average value feeding strategies ($r = −.188$, $p < .01$). In contrast, the correlation of FF with Coercive Practices found a significant correlation ($r = .210$, $p < .01$) suggesting that children of parents who use Coercive Practices who reward, pressure, or distract children were more synchronous in their fussy eating behaviours. In addition, more Positive Practices were recorded in the group that exhibited less Coercive Practices ($r = –.534$, $p < .01$) suggesting these parental practices are conceptually, and behaviourally, distinct, and function, quite often, in opposition.

The findings of this study greatly support the idea of using supportive parenting techniques rather than controlling approaches to help reduce picky eating behaviours during the early childhood years.

Table 1. Demographic Characteristics of the Study Participants (n= 360)

Variable	Category	Frequency (%)
Age Group	Early Preschool (3 years)	166 (46.11%)
	Mid Preschool (4 years)	98 (27.2%)
	Late Preschool (5–6 years)	96 (26.7%)
Gender	Male	128 (35.6%)
	Female	232 (64.4%)
BMI-for-Age (Z-score)	Underweight (Z < -2)	90 (25%)
	Normal (-2 ≤ Z ≤ 1)	138 (38.3%)
	Overweight (Z > 1)	74 (20.6%)
	Obese (Z > 2)	58 (16.1%)
Socioeconomic Status	Low	137 (38.1%)
	Middle	133 (36.9%)
	High	90 (25%)

Table 2. Comparison of Picky Eating (Food Fussiness) and Emotional Overeating Across BMI Categories in Young Children (N = 360)

Variable	BMI Category	M (SD)	95% CI	F(3, 356)	p-value	η^2	Post Hoc
Food Fussiness	Underweight	2.47 (0.71)	2.26-2.68	16.99	.000	.125	1 > 2 > 3 > 4
	Normal	2.15 (0.77)	1.99 -2.31				
	Overweight	2.01 (0.71)	1.84 - 2.18				
	Obesity	1.64 (0.49)	1.45 - 1.83				
Emotional Overeating	Underweight	2.48 (0.50)	2.36 - 2.60	37.63	.000	.24	1 > 2 > 3 > 4
	Normal	2.14 (0.40)	2.06 - 2.22				
	Overweight	1.99 (0.45)	1.90 - 2.08				
	Obesity	1.71 (0.46)	1.62 -1.80				

Note. F(3, 356) = F-value with degrees of freedom; p = significance level; η^2 = partial eta squared (effect size); Post Hoc = order of group differences based on post-hoc comparisons; CI = 95% Confidence Interval

Table 3. Effect of frequent vs. infrequent use of positive parental nutritional practices on picky eating behaviors (measured by Food Fussiness) in young children (n= 360)

Category	Variables	n	Mean	SD	t (358)	p	Cohen's d
Positive Parenteral Nutritional Practices	Frequent Use	202	2.00	0.736	3.618	0.000	.379
	Infrequent Use	158	2.28	0.74			

Note. M = Mean; SD = Standard Deviation; t = t-value; p = significance level (p-value); Cohen's d = Effect size.

Table 4: Correlations between picky eating behaviors (measured by Food Fussiness) and specific parental nutritional practices (positive practices and coercive practices) in young children (n= 360)

Variable	1	2	3
1. Food Fussiness	.00		
2. Positive Practices	.00	-.188**	
3. Coercive Practices	-.188**	.210**	-.534**

Note: **. Correlation is significant at the 0.01 level (2-tailed)

DISCUSSION

This research forms an integral part of the studies conducted on the correlates of the emotional eating of picky eaters and the Body Mass Index for age categories among preschool children in the region of Pakistan. The data shows that underweight children are more food fussiness and emotionally overeat compared to the normal weight, overweight, and obese groups, whose scores on both constructs are much lower and almost resemble each other. Our study supports our formulated hypothesis. This finding, while surprising, does highlight complex parent–child relationships in which underweight children (and perhaps in the underweight range) receive more emotional feeding as part of some compensatory or comforting strategy during episodes of some under appetite or disinterest of food.[11] Parents in the United Kingdom and China also reported that underweight children were recipients of food as emotional reassurance, rather than food of nutritional value. A more plausible explanation to the finding of this group of children could lie in the reporting bias, as parents of underweight children may emotionally overeat as a response to under heightened concern on the child´s nutritional status. The finding also suggests that parents need, within the different cultural frameworks, to disentangle emotional eating from eating due to hunger.[12]

The findings go beyond behavioral data, to show that children whose parents routinely practiced nutritional parental positivity, for instance, inclusion of children in meal prep, moderation of variety, and positive mealtime atmosphere had markedly lower food fussiness scores than peers whose parents rarely practiced such habits. These findings are consistent with previous literature suggesting that positive feeding frameworks promote autonomy and food acceptance. In contrast, the use of low autonomy feeding practices, such as coercion and pressure, were associated with increased food fussiness, illustrating the control-pull paradigm. Therefore, the data suggests that gentle parental control is necessary for the development of balanced eating habits in young children.[13] Therefore supporting our hypothesis. In contrast, the use of low autonomy feeding practices, such as coercion and pressure, were associated with increased food fussiness, illustrating the control-pull paradigm.[14] Therefore, the data suggests that gentle parental control is necessary for the development of balanced eating habits in young children.

With respect to investigate the correlations between picky eating behaviors and specific parental nutritional practices (positive practices and coercive practices) in

young children, our results revealed a modest but statistically significant negative correlation between positive feeding practices and food fussiness, and a positive correlation between coercive feeding practices and food fussiness. These findings are aligned with previous literature indicating that parental use of pressure, bribes, and restrictions are counterproductive and often exacerbate picky eating tendencies.[15] A 2022 study published in Nutrients similarly found that the use of supportive, autonomy-promoting feeding strategies was inversely associated with food refusal behaviors in young children.[16,17] The present study adds to this body of evidence by demonstrating that even small variations in feeding style can have measurable effects on children's eating behavior patterns.

Pakistani child nutrition and early education sectors can benefit immensely from this research and its policy ramifications. Findings can be incorporated in nutrition education, parental counseling and preschool health curricula by advocating responsive feeding and avoiding force feeding.[18] In Pakistan, children are often fed as a sign of affection or to soothe and unwillingness to eat or a loss of appetite from child's feeding autonomously. Such awareness programs can be integrated into schools and community health programs to encourage children to eat a balanced meal and to nurture self-reflection toward their eating habits.[19,20] Enhanced community impact can be achieved by incorporating these concepts into the initiatives of Lady Health Workers and other maternal health programs.

This study has added to the understanding of the relationship between parental feeding styles, BMI, and eating behaviors in the local context. It connects parental behaviors and their measurable outcomes with children to offer nutrition policy reform, caregiver education, and Pakistan-specific responsive strategies. In the future, researchers trying to validate these findings as well as the reciprocal relationship between feeding behaviors and nutritional status will add longitudinal research designs and representation from various regions.

CONLUSION

The study focused on three primary goals: determining the correlation between eating habits and BMI, examining the impact of positive parental nutritional practices, and investigating the relationship between particular feeding strategies and picky eating amongst toddlers. The results indicated that underweight children demonstrated the most severe picky eating (food fussiness) and emotional overeating, both of which diminished as BMI increased, thus indicating an association with the level of nutritional status. Moreover, children whose parents reported high frequencies of positive nutritional practices were fussy about food much less than their peers, thus indicating the protective effect of responsive feeding practiced at the family level. In contrast, feeding strategies which were coercive were strongly associated with increased levels of picky eating, thus indicating the control of risk behavior in feeding practices. These results underscore the feeding behavior patterns of Pakistani children attending schools. They advocate for the incorporation of responsive feeding practices in early nutrition counselling for parents.

DECLARATION

Conflict of Interest: The authors declare no conflict of interest.

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